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# THE PLANT DISEASE REPORTER

**Issued By**

**Division of Mycology and Disease Survey**

**BUREAU OF PLANT INDUSTRY**

**UNITED STATES DEPARTMENT OF AGRICULTURE**

**Volume 26** **Number 5**

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BELTSVILLE BRANCH

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

# THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Volume XXVI March 15, 1942 Number 5


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## CHECK LIST REVISION

Freeman Weiss

QUERCUS -- continued.

QUERCUS AGRIFOLIA Nee, COAST LIVE OAK. Large evergreen tree or shrub of Growth Regions 1 and 5. Including also Q. WISLIZENII A. DC., interior LIVE OAK OF G.R.'s 4, 5, 10; Q. KELLOGII Newb., CALIFORNIA BLACK OAK (deciduous) of G.R.'s 1, 3, 4, 5, 10.

Armillaria mellea Vahl ex Fr., root rot. Calif.
Botryosphaeria quercuum (Schw. ex Fr.) Sacc., on branches. Calif.
(Coryneum kunzei Cda.): Pseudovalsa longipes.
Cronartium quercuum (Berk.) Miyabe, leaf rust (II). Calif., Oregon.
Cylindrosporium kelloggii Ell. & Ev. (? Septogloeum defolians Harkn.), leaf spot. Calif.
Dichaena quercina Pers. ex Fr., on twigs. Calif.
Endothia gyrosa (Schw.) Fr. and E. singularis (Schw.) Shear & N. E. Stevens, on branches. Calif.
Erysiphe trina Harkn., powdery mildew, witches'-broom. Calif.
Fomes applanatus (Pers. ex Fr.) Gill., white mottled heart rot. Calif.
Gloeosporium quernum Harkn., leaf blight. Calif.
Gnomonia veneta (Sacc. & Speg.) Kleb., anthracnose. Oregon.
Heterodera marioni (Cornu) Goodey, root knot. Calif.
Laestadia auripunctum Harkn., on leaves. Calif.
Lenzites betulina L. ex Fr., brown cubical wood rot. Calif.
Leptothyrium californicum Bubak, leaf spot (of Q. morehus Kell.). Calif.
Microsphaera alni DC. ex Wint., powdery mildew. Calif.
Monochaetia desmazierii Sacc., leaf spot. Calif.
Mycosphaerella dryophila (Cke. & Harkn.), on leaves. Calif.
Nummularia clypeus (Schw.) Cke., on branches. Calif., Oregon.
Phleospora hanseni Bubak, on leaves of Q. morehus Kell. Calif.
Phoma discosiiformis Cke. & Harkn., on leaves. Calif.
Phoradendron villosum Nutt., mistletoe. Calif., Oregon.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Calif.
Phyllosticta agrifolia Ell. & Ev., on leaves. Calif.
P. wislizenii Ell. & Ev. Calif.
Physalospora agrifolia Ell. & Ev., on leaves. Calif.
Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. Calif.
Polyporus dryophilus Berk., white pocket heart rot. Calif., Oregon.
P. sulphureus Bull. ex Fr., brown cubical heart rot. Calif.
P. versicolor L. ex Fr., sapwood rot. Calif., Oregon.
Pseudovalsa longipes (Tul.) Sacc., twig canker. Calif.
Septobasidium canescens Burt, on scale insects infesting bark. Calif.
Septoria quercicola Sacc., leaf spot. Calif.
Sphaeropsis quercina Cke. & Harkn., on branches. Calif. (An untenable name).
Sphaerotheca lanestris Harkn., brown mildew. Calif.

QUERCUS -- continued.

Stereum spp., wood rot. Occasional. Spp. reported include S. fasciatum Schw., S. gausapatum Fr., S. hirsutum Willd. ex Fr., S. rugosum Pers. ex Fr.

Taphrina caerulescens (Desm. & Mont.) Tul., leaf blister.

QUERCUS ALBA L., WHITE OAK. Forest tree of Growth Regions 20, 22, 23, 24, 25, 26, 27, 28, 29, 30; cult. Zone IV; the vars. LATILOBA Sarg., PINNATIFIDA Michx., and REPANDA Michx. are sometimes distinguished. Including Q. BICOLOR Willd., SWAMP WHITE OAK of G.R.'s 21, 22, 23, 24, 25, 26, 27, 28; Q. CHAPMANII Sarg., CHAPMAN OAK, of G.R.'s 29, 30; and Q. STELLATA Wang., POST OAK, of G.R.'s 19, 20, 22, 25, 27, 28, 29, 30.

Aleurodiscus oakesii (Berk. & Curt.) Cke., smooth patch. N.Y. to N.Car. Iowa & Wis. A. candidus (Schw.) Burt and A. acerinus (Pers.) Höhn. & Litsch. also are reported on bark of living trees or causing wood rot in same range.

Anthostoma dryophilum (Curr.) Ell. & Ev., on dead branches. Iowa, N.J., Texas.

Armillaria mellea Vahl ex Fr., root & butt rot. Widespread.

Botryosphaeria quercuum (Schw. ex Fr.) Sacc., on branches. Ga.

Bulgaria inquinans Fr., on branches. Conn., N.J.

Clitocybe tabescens Scop. ex Fr., root rot. Okla.

Coccomyces triangularis (Schw. ex Fr.) Sacc., on twigs. Ga., Md., Ohio.

Conopholis americana Wallr., parasitic on roots. Va.

Cronartium quercuum (Berk.) Miyabe, leaf rust (II,III). N.J. to Ala., La., & Wis. (C. fusiforme Hedgc. & Hahn and C. strobilinum Hedgc. & Hahn, reported on Q. stellata in Miss. and S.Car., are included with this sp. by Arthur, but are distinct on their pine hosts (O,I).

Cryptosporella albofusca (Cke. & Ell.) Sacc., on branches. N.Y.

Cylindrosporium microspilum Sacc. & Wint., leaf spot. Mo.

Daedalea quercina L. ex Fr., butt rot, heart rot, Widespread. Other spp. reported as causing wood rot, sometimes in living trees, are D. ambigua Berk., Ark., Texas; D. confragosa Bolt. ex Fr., Eastern & Central States; D. unicolor, Ala., N.Car., Va.

Daldinia vernicosa (Schw.) Ces. & DeNot., wood rot. Eastern & Central States.

Dermatea lobata Ell., on branches. N.J., N.Y.

Diaporthe leiphaemia var. raveneliana (Thüm. & Rehm) Wehmeyer, on branches. Mass. to Fla., Mich. & Mo.

Dichaena quercina Pers. ex Fr., bark canker. N.J.

Diplodia longispora Cke. & Ell., twig blight. N.J., N.Y.

Dothiorella phomiformis (Sacc.) Petr. & Syd., leaf spot. Mass. to Va., Mo. & Wis.

Endothia gyrosa (Schw.) Fr., on branches & exposed roots. Ky., N.Car., S.Car.

Fistulina hepatica Huds. ex Fr., brown heart. Va.

Fomes applanatus (Pers. ex Fr.) Gill., white mottled butt rot. Eastern & Central States. Other spp. causing wood rot often in living

QUERCUS -- continued.

trees, include F. connatus (Weinm. ex Fr.) Gill., Ohio; F. everhartii (Ell. & Gall.) Schrenk, Ind., N.Y., N.Car.; F. fomentarius (L. ex Fr.) Kickx, Ala.; F. igniarius (L. ex Fr.) Kickx, Vt.; F. lobatus (Schw.) Cke., Ark.; F. marmoratus Berk. & Curt., Ala.

Gloeodes pomigena (Schw.) Colby, on branches. Ala.

Gloeosporium septorioides Sacc. (Marsonia quercina Wint.), leaf spot. Ill., Md., Mo., N.Y., Wis.

G. umbrinellum Berk. & Br., leaf spot. Pa. (Possibly = G. quercinum Westend., conidial stage of Gnomonia quercina Kleb.)

Gnomonia veneta (Sacc. & Speg.) Kleb., anthracnose, leaf & twig blight. Eastern & Central States to Ga. & Kans.

Godroniopsis quernea (Schw.) Diehl & Cash, on twigs. N.J.

Graphium rubrum Rumbold, gray wood stain. Ohio to Ark. & S.Car.

Hydnum erinaceus Bull. ex Fr., white spongy rot, often in living trees. Pa. to N.Car. & Ark.

Lenzites betulina L. ex Fr., wood rot. Cosmopolitan.

Leptothyrium dryinum Sacc., leaf spot. Miss., Texas, Wis.

Marssonina martini (Sacc. & Ell.) P. Magn., leaf spot. N.Y. to Miss., Iowa & Wis.

M. quercus (Pk.) P. Magn., Md., Mo.

Microsphaera alni DC. ex Wint., powdery mildew. Widespread.

M. a. var. calocladophora (Atk.) Salm. Tenn.

M. a. var. extensa (Cke. & Pk.) Salm. Ill., Iowa, N.Car.

Microstroma album (Desm.) Sacc., downy spot. W.Va.

Monochaetia desmazierii Sacc., leaf spot. Eastern States to S.Car., Ark. & Ill.

Morenoella quercina (Ell. & Mart.) Theiss., leaf spot, Fla.; twig blight, Texas.

Mycosphaerella spleniata (Cke. & Pk.) House, on fallen leaves. N.Y.

Nectria coccinea Pers. ex Fr. (? N. ditissima Tul.), trunk canker. Conn. to W. Va.

Nummularia clypeus (Schw.) Cke., on branches. N.Y. to Ga. & Ind.

Phoma glandicola (Desm.) Lev., on acorns & insect galls. Ind., N.Y., Ohio.

Phoradendron flavescens (Pursh) Nutt., mistletoe. N.Car. to Fla., Texas & Ind.

Phyllactinia corylea Pers. ex Karst., powdery mildew, N.J. to Ga. & Miss.

(Phyllosticta phomiformis Sacc.): Dothiorella phomiformis.

P. tumoricola Pk., leaf spot (associated with insect galls). N.Y.

Physalospora glandicola (Schw.) N.E. Stevens (Sphaeropsis gallae (Schw.) Berk. & Curt.), canker, dieback. Ill.

P. obtusa (Schw.) Cke. (Sphaeropsis malorum Pk.), on branches. Minn., Va.

P. rhodina (Berk. & Curt.) Cke. Va.

Phytophthora cinnamomi Rands, seedling wilt. Md.

Polyporus berkeleyi Fr., butt rot, string & ray heart rot. Ark., Mo.

P. croceus Pers. ex Fr., butt rot, white pocket heart rot. Ark., Mich.

QUERCUS -- continued.

P. dryadeus Pers. ex Fr., white root rot. Pa. to Va., Okla. & Texas.
P. dryophilus Berk., white pocket heart rot. N.Y. to Tenn., Texas, & Ill.
P. hispidus Bull. ex Fr., trunk canker, heart rot. Conn., Va.
P. sulphureus Bull. ex Fr., butt rot, brown cubical heart rot. Ark., Ind., W.Va.
Polyporus spp., wood rot, sometimes in living trees. P. frondosus Dicks. ex Fr., Ark.; P. gilvus (Schw.) Fr., widespread; P. obtusus Berk., N. Car., Tenn.; P. schweinitzii Fr., on roots. Pa.
Pseudovalsa longipes (Tul.) Sacc. (Coryneum kunzei Cda.), twig canker. N.J., Va., Iowa.
Scleroderma vulgare Hornem., parasitic mycorhiza. Mich.
Septogloeum querceum J.J.Davis, leaf spot. Wis. (=Marssonina ?)
Septoria quercus Thüm., leaf spot. Ill.
Sphaerognomonia polystigma (Ell. & Ev.) Thompson & J.H.Miller, on leaves. Ga.
Sphaeropsis linearis Pk., on twigs. N.Y.
Sphaerotheca lanestris Harkn., brown mildew. Ala., Miss., Ill., Iowa.
Stereum gausapatum Fr., white pocket heart rot. Ind., N.Y.
S. subpileatum Berk. & Curt., white pocket heart rot. Ark., Del., Va.
Stereum spp., wood rot, chiefly of logs & stumps. S. fasciatum Schw., Ind., N.J., Va.; S. frustulosum Pers. ex Fr., N.E. and Central States; S. sericeum Schw., N.Car., Pa.
Strumella coryneoidea Sacc. & Wint., trunk canker. Conn. to Va. & Mo.
Taphrina caerulescens (Desm. & Mont.) Tul., leaf blister. N.E. to Central & Gulf States.
Thelephora albido-brunnea Schw. and T. terrestris Ehr. ex Fr., collar girdle of seedlings. Ind., N.Car.

QUERCUS ARIZONICA Sarg., ARIZONA WHITE OAK. Small tree or shrub of Growth Regions 10 & 11. Together with other shrubby, evergreen or partly evergreen, spp. of the white oak group in the Southwest and Pacific Coast regions, as Q. GRISEA Liebm., GRAY OAK; Q. SINUATA Walt.; Q. TOUMEYI Sarg., TOUMEY OAK; Q. ENGELMANNII Greene, ENGELMANN OAK; Q. OBLONGIFOLIA Torr., MEXICAN BLUE OAK; Q. DOUGLASII Hook. & Arn., CALIFORNIA BLUE OAK; Q. DIVERSICOLOR Trel., NETLEAF OAK; and Q. DUMOSA Nutt., CALIFORNIA SCRUB OAK. Q. EMORYI Torr., EMORY OAK, and Q. HYPOLEUCOIDES A. Camus (Q. hypoleuca Engelm.), SILVERLEAF OAK, also are included because of similar growth habit and range though of black oak affinities.

Armillaria mellea Vahl ex Fr., root rot. Calif.
Coryneum umbonatum Nees, on twigs. Calif.
Cronartium conigenum Hedgc. & Hunt, leaf rust (II,III). On Q. emoryi and Q. hypoleucoides, Ariz.
C. quercuum (Berk.) Miyabe, leaf rust (II,III). Ariz., Calif.

QUERCUS -- continued.

Fomes applanatus (Pers. ex Fr.) Gill., white mottled butt & heart rot. Ariz., Calif.
F. everhartii (Ell. & Gall.) Schrenk, white flaky heart rot. Calif.
Nummularia clypeus (Schw.) Cke., on branches. Ala.
Phoradendron villosum (Pursh) Nutt., mistletoe. Calif., Oregon.
Phyllosticta livida Ell. & Ev., leaf spot. Calif.
Polyporus dryophilus Berk., white pocket heart rot. Ariz., Calif., N.Mex. Other spp. causing wood decay, sometimes in living trees, include P. biformis (Klotzsch) Berk., Ariz.; P. gilvus (Schw.) Fr., Ariz., N.Mex.; P. obtusus Berk., Ariz.; P. tulipiferus (Schw.) Overh., Ariz.
Taphrina caerulescens (Desm. & Mont.) Tul., leaf blister. Calif.
Trabutia erythrospora (Berk. & Curt.) Cke., leaf patch (epiphyllous). Ariz.

QUERCUS BICOLOR Willd., under Q. ALBA.

QUERCUS BOREALIS Michx. f. (? Q. rubra L.), NORTHERN RED OAK. Forest tree of Growth Regions 21, 22, 23, 24, 25, 26, 27; widely grown for shade, Zone IV. A more robust form, usually designated as Q. BOREALIS var. MAXIMA (Marsh.) Ashe, EASTERN RED OAK, occurs in the same range. (Some recent authorities have concluded that this oak is, after all, the one Linnaeus called Q. rubra, a name now widely accepted as belonging to the Southern red oak. Rehder's derogation of Q. rubra L. as a confused name, with Q. borealis retained for the Northern red oak and Q. falcata for the Southern, seems a successful disposition of the question and is followed here.)

Armillaria mellea Vahl ex Fr., root rot. Widespread.
Botryosphaeria melanops (Tul.) Wint. (Dothiorella advena Sacc.), on branches. Conn.
Coccomyces triangularis (Schw.) Sacc., on twigs. Md.
Conopholis americana Wallr., parasitic on roots.
Coryneum kunzei Cda., twig blight, canker. Iowa, Mass., Mich.
Cronartium quercuum (Berk.) Miyabe, leaf rust (II,III). Widespread.
Daedalea quercina L. ex Fr., wound rot, brown crumbly heart rot. Widespread.
D. confragosa Bolt. ex Fr., Me., N.Y.
Diplodia longispora Cke. & Ell., twig blight. Ohio.
Dothiorella phomiformis (Sacc.) Petr. & Syd., leaf spot. N.Y., Vt.
Endothia gyrosa (Schw.) Fr., on bark of exposed roots, ? canker. Ga., Ind., Mo.
E. parasitica (Murr.) P.J. & H.W. Anderson, on branches. Conn., Ind.
Fomes applanatus (Pers. ex Fr.) Gill., white mottled butt rot. Widespread.
F. connatus (Weinm. ex Fr.) Gill., wood rot. Mass.

QUERCUS -- continued.

F. everhartii (Ell. & Gall.) Schrenk., trunk canker, heart rot. Mich., Minn.
F. igniarius (L. ex Fr.) Kickx, white heart rot, wound rot. Conn., Minn.
F. lobatus (Schw.) Cke., wood rot. N.Y.
Gloeosporium septorioides Sacc., leaf spot. Va.
Gnomonia veneta (Sacc. & Speg.) Kleb., leaf blight. Conn. to Ga., Ind., & Minn.
Graphium rigidum (Pers.) Sacc. & G. rubrum Rumbold, wood stain. Ind.
Hydnum erinaceus Bull. ex Fr., white spongy rot. Eastern to Gulf States.
Lenzites betulina L. ex Fr., wood rot. Cosmopolitan.
Leptothyrium dryinum Sacc., leaf spot. Ga., N.Y., Wis.
Marssonina martini (Sacc. & Ell.) P. Magn., leaf spot. N.Y. to Iowa & Wis.
Microsphaera alni DC. ex Wint., powdery mildew. Widespread.
M. a. var. extensa (Cke. & Pk.) Salm. Md., Pa., Ohio, N.Car.
Monochaetia desmazierii Sacc., leaf spot. Pa. to Ga., Tenn. & Ohio.
Morenoella quercina (Ell. & Mart.) Theiss., purple blotch. Ga., N.Car., Va.
Nectria cinnabarina Tode ex Fr., on twigs. Ind., Pa.
N. coccinea Pers. ex Fr. (N. ditissima Tul.) and N. galligena Bres., branch & trunk canker. N.H. to W.Va.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Ill., Ind., Ohio, Va.
Physalospora glandicola (Schw.) N.E. Stevens, twig blight, nut rot. Md., Mass.
P. obtusa (Schw.) Cke., twig blight. Minn.
Phytophthora cinnamomi Rands, seedling wilt. Md.
Polyporus dryadeus Pers. ex Fr., white root & butt rot. Va. to Texas.
P. spraguei Berk. & Curt., butt rot, brown cubical heart rot. Ind., Mass., Va., Wis.
P. sulphureus Bull. ex Fr., brown heart rot. Widespread.
Polyporus spp. Others reported causing wood decay, sometimes in living trees include: P. albellus Pk., Me.; P. biformis (Klotzsch) Berk., Ind.; P. cinnabarinus Jacq. ex Fr., Me., Vt., Wis.; P. compactus Overh., Me.; P. dichrous Fr., Me.; P. frondosus Fr., Mass.; P. gilvus (Schw.) Fr., N.Y.; P. graveolens (Schw.) Fr., N.Y.; P. hirsutus Wulf. ex Fr., Me., Vt., Wis.; P. hispidus Bull. ex Fr., Conn.; P. obtusus Berk., Minn.; P. semipileatus Pk., P. versicolor L. ex Fr., widespread.
Pseudovalsa longipes (Tul.) Sacc., twig canker. Iowa.
Septoria sp., leaf spot. Pa. S. quercicola (Desm.) Sacc., Minn., N. Car.
Sphaerognomonia polystigma (Ell. & Ev.) Thompson & J.H. Miller, on leaves. Ga.
Stereum spp. (S. frustulosum Pers. ex Fr., S. gausapatum Fr. and S. subpileatum Berk. & Curt.), sprout butt rot, white pocket heart rot. Widespread. Other spp. as S. fasciatum Schw., S. hirsutum Willd. ex Fr. and S. lobatum (Kze.) Fr. common on dead wood.

QUERCUS -- continued.

Strumella coryneoidea Sacc. & Wint., trunk canker. Minn., Mo., N.Y., Pa.
Taphrina caerulescens (Desm. & Mont.) Tul., leaf blister. General.
T. rubrobrunnea (Pk.) Sacc., N.Y.

(QUERCUS CALIFORNICA (Torr.) Cooper): Q. KELLOGGII Newb.
(QUERCUS CATESBAEI Michx.): Q. LAEVIS Walt.

QUERCUS CHRYSOLEPIS Lieb., CANYON LIVE OAK. Evergreen tree, often shrubby, of Growth Regions 1, 4, 10, 11 & 14, grown for shade & ornament in Calif.; also Q. PALMERI Englem., PALMER OAK, of G.R.'s 9, 11, & 14; and Q. TOMENTELLA Engelm., ISLAND LIVE OAK, of S. Calif. coast.

Cercospora macrochaeta Ell. & Ev., leaf spot. Calif.
Cronartium quercuum (Berk.) Miyabe, leaf rust II, III. Calif.
Lenzites betulina L. ex Fr., wood rot. Oregon.
Mycosphaerella operculata (Sacc.), on leaves. Calif. to Wash.
Phoradendron villosum Nutt., mistletoe. Calif., Oregon.
Phyllosticta agrifolia Ell. & Ev., leaf spot. Calif.
Polyporus dryophilus Berk., white pocket heart rot. Ariz., Calif.
P. sulphureus Bull. ex Fr., brown heart rot. Calif.
Venturia echinata (Ell. & Ev.) Theiss., black patch. Calif., Oregon.

QUERCUS CINEREA Michx., under Q. PHELLOS.
QUERCUS COCCINEA Muench., SCARLET OAK. Forest tree of Growth Regions 21, 22, 23, 24, 25, 26, 27, 28; also cult. for shade & ornament, Zone IV. Including Q. GEORGIANA Curtis, GEORGIA OAK, of G.R.'s 27 & 28.

Armillaria mellea Vahl. ex Fr., root rot. Widespread.
Botryodiplodia ravenelii Sacc. (=Physalospora glandicola?), twig blight. Ohio.
Botryosphaeria quercuum (Schw. ex Fr.) Sacc., on branches. Ga.
Bulgaria inquinans Pers. ex Fr., on branches. Ala., Conn., N.Y.
Cenangium tetrasporum (Ell.) Sacc., on branches. N.J.
Cronartium quercuum (Berk.) Miyabe, leaf rust (II,III). Conn. to Va. and Minn.
Dichaena quercina Pers. ex Fr. and D. strumosa Fr., branch canker. Ga., N.J.
Diplodia longispora Cke. & Ell., on branches. N.J., Va.
Endothia gyrosa (Schw.) Fr., on branches & exposed roots. Mich. to Ga. & N.Car.
Fomes applanatus (Pers. ex Fr.) Gill., butt rot, white mottled heart rot. Widespread.
F. everhartii (Ell. & Gall.) Schrenk, white flaky heart rot. Widespread.
Gloeosporium septorioides Sacc., leaf spot. N.J. to Mich. & Kans.

QUERCUS -- continued.

Gnomonia veneta (Sacc. & Speg.) Kleb., leaf spot. R.I.
Godroniopsis quernea (Schw.) Diehl & Cash, on branches. Ala., Conn., N.J.
Leptothyrium dryinum Sacc., leaf spot. Iowa, N.J., Pa.
Marssonina martini (Sacc. & Ell.) P. Magn., leaf spot. Ill., Mich., Minn.
Microsphaera alni DC. ex Wint., powdery mildew. Widespread. Var. extensa (Cke. & Pk.) Salm., Ohio.
Monochaetia desmazierii Sacc., leaf spot. Md., Tenn.
Morenoella quercina (Ell. & Mart.) Theiss., leaf blotch. N.Car.
Nectria sp., trunk canker. Conn., Mass.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Ga.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Va. to Tenn. and Ill.
Physalospora obtusa (Schw.) Cke., on branches, ? canker. Minn., Va.
P. quercifolia (Cke.) Ell. & Ev., on leaves. Ohio.
Polyporus dryophilus Berk., butt rot, white pocket heart rot. Md.
P. hispidus Bull. ex Fr., trunk canker, heart rot. Conn.
P. sulphureus Bull. ex Fr., brown heart rot. Minn.
Polyporus spp., wood rot, sometimes in living trees. P. croceus Pers. ex Fr., Mo.; P. gilvus (Schw.) Fr., Pa.; P. graveolens (Schw.) Fr., N.Y.; P. hirsutus Willd. ex Fr., widespread; P. spraguei Berk. & Curt., Ind., Va., Wis.
Pseudovalsa longipes (Tul.) Sacc., on twigs, ? canker. Pa.
Sphaerognomonia polystigma (Ell. & Ev.) J.H. Miller & Thompson, on leaves. Ga., N.J., Ohio.
Stereum subpileatum Berk. & Curt., white pocket butt & heart rot. Eastern States.
Strumella coryneoidea Sacc. & Wint., trunk canker. N.E. and Great Lakes States.
Taphrina caerulescens (Desm. & Mont.) Tul., leaf blister. Widespread.
Ustulina vulgaris Tul., wood rot. Occasional.

QUERCUS DIVERSICOLOR Trel., Q. DOUGLASII Hook. & Arn., Q. DUMOSA Nutt., under Q. ARIZONICA.
QUERCUS ELLIPSOIDALIS E.J. Hill, under Q. PALUSTRIS.
QUERCUS EMORYI Torr. and Q. ENGELMANNII Greene, under Q. ARIZONICA.

QUERCUS FALCATA Michx., SOUTHERN RED OAK (Spanish oak). Large tree of Growth Regions 20, 25, 27, 28, 29, 30. Including the var. PAGODAEFOLIA Ell., SWAMP SPANISH OAK; also Q. TEXANA Buckl., TEXAS OAK, and Q. SHUMARDII Buckl., SHUMARD OAK (which may together constitute only one sp.) of G.R.'s 16,19, & 22 in addition.

Ceratostomella pluriannulata Hedgc., blue stain. Miss.
Cronartium quercuum (Berk.) Miyabe, leaf rust (II,III). Md. to Ga. and Miss. (C. fusiforme Hedgc. & Long reported in N.Car.)
Endothia gyrosa (Schw.) Fr., on branches & exposed roots. N.Car., Tenn. & Va.

QUERCUS -- continued.

Fomes applanatus (Pers. ex Fr.) Gill., butt rot, heart rot. Widespread.
F. everhartii (Ell. & Gall.) Schrenk and F. igniarius (L. ex Fr.) Kickx, wound rot, heart rot. Widespread.
F. fomentarius (L. ex Fr.) Kickx and F. marmoratus Berk. & Curt., wood rot. Occasional.
Ganoderma curtisii (Berk.) Murr., root & butt rot. S.Car.
Gnomonia veneta (Sacc. & Speg.) Kleb., leaf blight. Tenn.
Hydnum erinaceus Bull. ex Fr., white spongy heart rot. Widespread.
Microsphaera alni DC. ex Wint., powdery mildew. N.Car. to Texas.
Monochaetia desmazierii Sacc., leaf spot. Va. to Fla. & Tenn.
Morenoella quercina (Ell. & Mart.) Theiss., leaf blotch. N.Car.
Phoradendron flavescens (Pursh) Nutt., mistletoe. N.Car. to Fla. & Texas.
Polyporus dryadeus Pers. ex Fr., white root & butt rot. Va. to Texas.
P. dryophilus Berk., white pocket heart rot. Ark.
P. frondosus Dicks. ex Fr., yellowish heart rot. Va.
P. obtusus Berk., white spongy heart rot. Ala.
Septoria dryina Cke., leaf spot. S.Car.
Stereum frustulosum Pers. ex Fr., white pocket heart rot. Va.
S. subpileatum Berk. & Curt., Ark., Va.
Taphrina caerulescens (Desm. & Mont.) Tul., leaf blister. N.Car. to Ala. & Okla.
Volvaria bombycina Pers. ex Fr., wound rot. Ga.

(DIVISION OF MYCOLOGY AND DISEASE SURVEY)

## NOTES ON PLANT DISEASES IN NORTH CAROLINA IN 1941

Following are brief notes on diseases occurring on various crops in North Carolina in 1941. The abnormal temperature and precipitation conditions that prevailed during the year had marked effects on the spread and severity of many common diseases. Total precipitation for the year was approximately normal (Fig. 1); however, it was extremely uneven in distribution, resulting in two distinct droughts, one in April, May, and June, and the other extending from August to November, inclusive. A period of excessive precipitation occurred in July; however, this was not of sufficient duration to permit above ground diseases to reach epidemic proportions. Abnormally high temperatures prevailed during the spring and fall droughts (Figure 2). -- Luther Shaw.

APPLE DISEASES. J. A. Lyle and Luther Shaw.

Apple scab (Venturia inaequalis) was present only to a slight degree in regularly sprayed orchards in North Carolina, as a result of the unusually dry weather which prevailed until July 1. The first ascospore discharge was noted in Buncombe County on April 18. The ascospores were mature at this date. Secondary scab lesions were present by July 3.

Fire blight (Erwinia amylovora) appeared during the latter part of May in scattered areas throughout the State, being first observed in

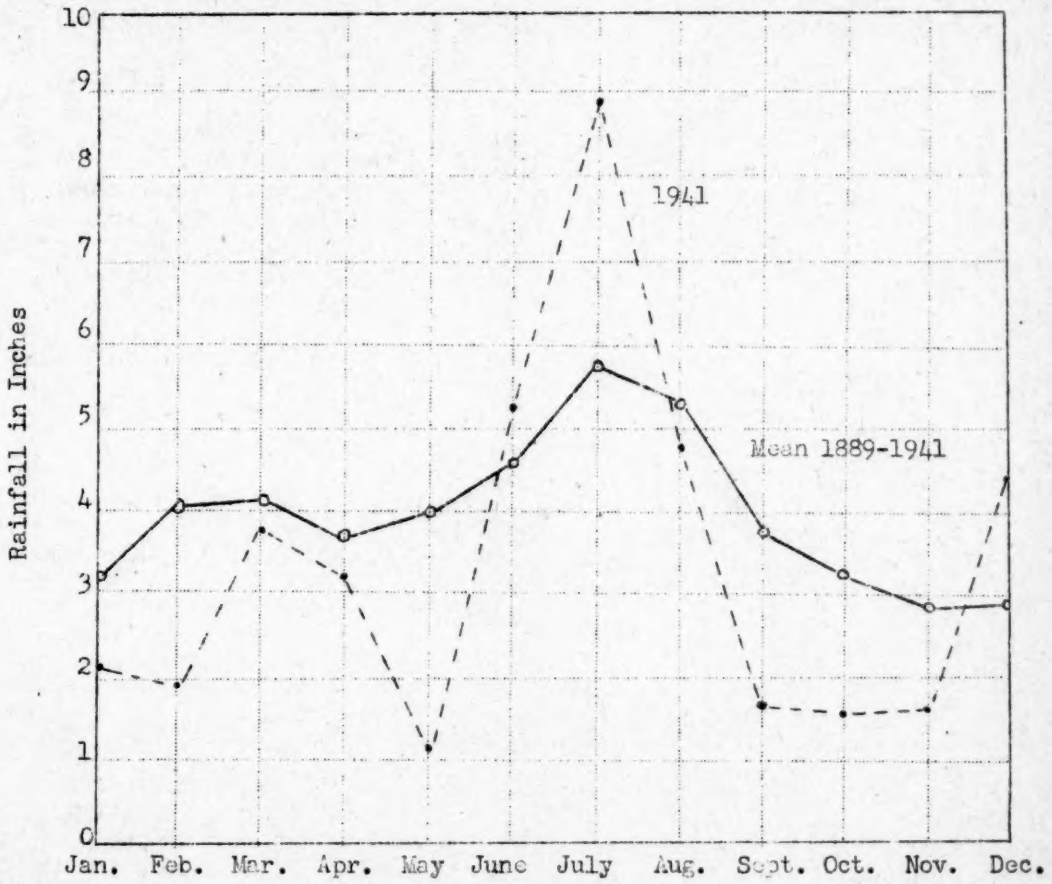


Figure 1. Rainfall in North Carolina, 1941.

Buncombe County on May 24. It was of no particular consequence in most orchards, but was severe in the piedmont area in both home and commercial orchards.

Bitter rot (Glomerella cingulata), in sprayed orchards caused no injury to such varieties as Delicious, Limbertwig, or Winesap. It was present, however, even in sprayed orchards on such varieties as Baldwin and Wolf River scattered throughout the State. Bitter rot lesions on the fruit were first apparent on July 31.

Blotch (Phyllosticta solitaria) caused no damage anywhere in regularly sprayed orchards. Frog-eye leafspot (Physalospora obtusa) and apple

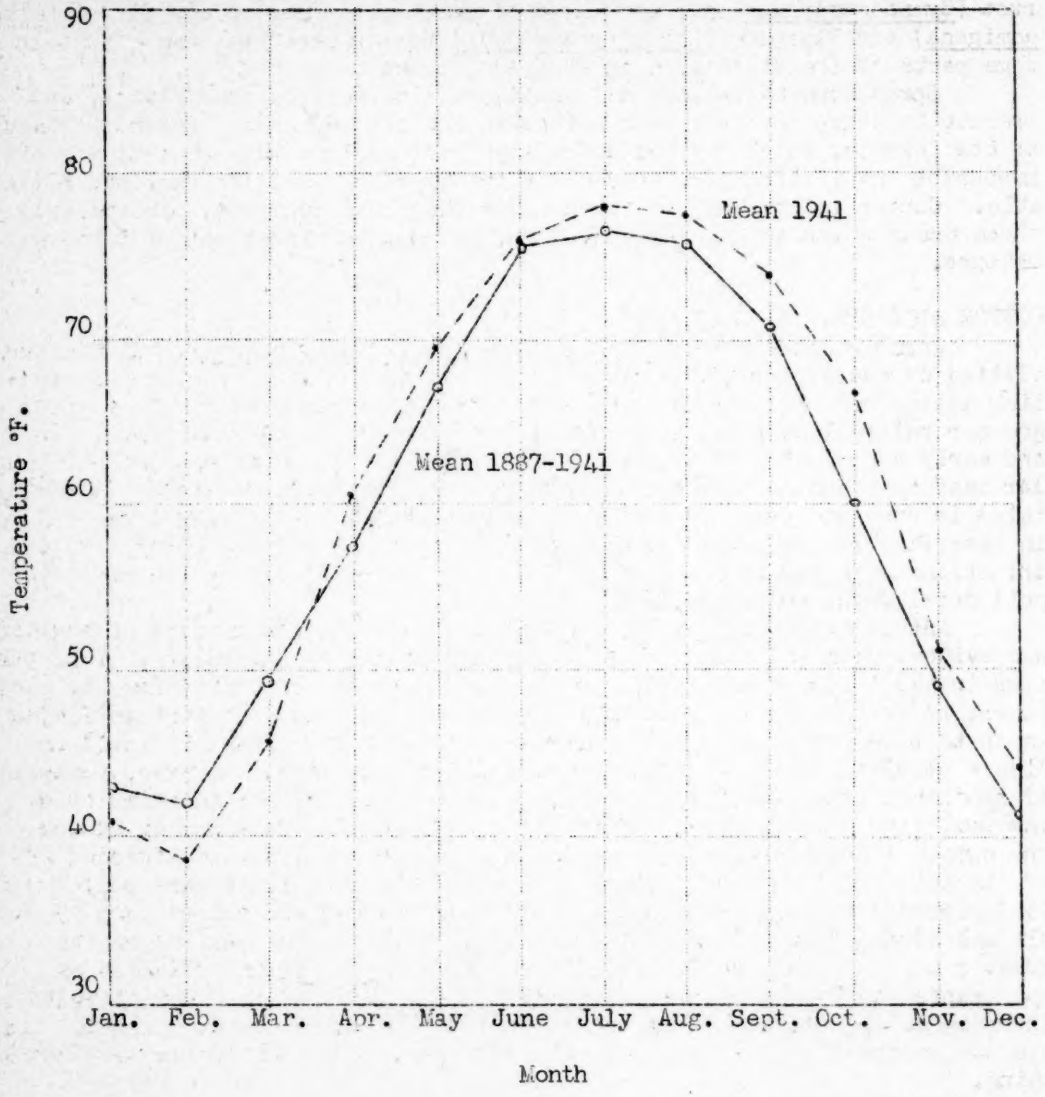


Figure 2. Mean temperatures in North Carolina.

rust (Gymnosporangium sp.) were also of no consequence. Sooty blotch (Gloeodes pomigena) and flyspeck (Leptothyrium pomi) were present to some extent in some parts of the State even in sprayed orchards.

Spray burn to foliage and fruit, particularly to the foliage, was present to a greater or lesser extent in certain orchards. Arsenical injury to the foliage, which resembled frog-eye leaf spot so much that it was often impossible to distinguish between the two types of leaf lesions, was noticeable. Copper injury both to fruit and foliage was apparent, particularly on those trees which were sprayed with the stronger applications of Bordeaux mixture.

COTTON DISEASES. S. G. Lehman.

Angular leaf spot (Bacterium [Phytomonas] malvacearum). In the areas visited by the writer (Piedmont and Upper Coastal Plain), lesions on seedling leaves were relatively few and inconspicuous compared to other years of greater rainfall during the period of seedling emergence and growth. In July and early August, however, some fields were found in which considerable angular leaf spot defoliation was occurring as a result of infections following rains in June and July. It was estimated that 10% of the leaves had fallen in some fields as a result of angular leaf spot infections. Very few boll infections were observed owing to the scanty rainfall during the period of boll development and maturation.

Anthracnose (Glomerella gossypii). Pre-emergence killing of seedlings was evident from the thin and irregular distribution of seedlings along the rows in about 20% of the fields examined. Contrary to observations of other years, however, very few seedlings died after emergence; in fact in fields known to have been planted with diseased seed, it was often difficult to find a seedling dead or obviously dying after emergence. However, removal of seedlings from such fields revealed anthracnose lesions on stems below the soil line. In 16 fields tested by removal of 25 seedlings at random, the number of diseased seedlings ranged from none to 84%, and averaged 28% of the total pulled. In 11 other fields in which seedlings were pulled until 25 diseased seedlings were found, the diseased seedlings ranged from 19 to 83% and averaged 40% of the total seedlings pulled. The lesions on the greater part of these seedlings were due to G. gossypii as indicated by appearance and by microscopic examination of some of them. Recognizable anthracnose infection on bolls was very uncommon in the areas visited. This was due apparently to scanty rainfall during the times the bolls were developing.

Pink boll rot (Fusarium moniliforme). This boll rot was not observed in the areas visited. In ordinary years pink boll rot can easily be found in almost any field one may examine.

Cercospora leaf spot (Cercospora gossypina). One field was found in which the leaves were very heavily infected with a Cercospora believed to be C. gossypina. As many as 25 to 50 lesions were present on a significant proportion of the leaves with some lesions on practically all the leaves. The more heavily infected leaves were becoming yellow and dropping prematurely. Potash deficiency was indicated by certain leaf symptoms and this condition may explain the high susceptibility of the foliage to infection by C. gossypina. Seed from the same source planted elsewhere showed very much less of Cercospora leaf spot.

Wilt (Fusarium vasinfectum) was more prevalent and destructive than usual on susceptible varieties.

POTATO DISEASES. L. W. Nielsen.

The extremely dry growing season experienced by the early potato growers in eastern North Carolina in 1941 had an appreciable effect on the incidence of diseases in the early crop.

Scab (Actinomyces scabies) was worse than usual, appearing on some farms where it had never been found before. On other farms where it had been present in previous years the entire crop had to be sold without grading. The disease reached economic importance only in localized areas, and then usually on the more sandy soils where the soil tested above pH 5.0.

Blackleg (Erwinia carotovora) [E. phytophthora] was generally distributed throughout the potato growing area, but was serious on a relatively small number of farms. The highest infection, about 10%, was observed on a small acreage near Elizabeth City. For the whole area the amount of blackleg was less than one percent.

Southern bacterial wilt (Phytomonas solanacearum) was the most serious disease in the potato area with greatest infection occurring in Pamlico County. Here the disease developed most seriously in low muck soils where the crop was harvested in late June or early July. The infection in a few cases was as great as 50 to 75% and the harvested crop was not disposed of through regular commercial channels owing to tuber rot. On the whole the disease was not so serious as it had been in previous years.

Transit rots presented no serious problem in 1941. Following a series of rain storms in late June in Camden County, a few cars of packed potatoes had to be regraded before shipping because of tuber rot. The potatoes were packed while wet and dirty and the rot was initiated at cuts, bruises or other injuries.

Bacterial ring rot [Phytomonas sepedonica] was not observed.

Early blight (Alternaria solani) appeared late in the growing season and was distributed throughout the potato area. On a few farms in Camden and Currituck Counties the foliage in some fields was nearly all destroyed. The reduction of yield in these fields was not determined.

A brief survey of the late potato area of western North Carolina was made during late July. Late blight (Phytophthora infestans) was the most common disease. Owing to the dry season foliage infection was not progressing very rapidly. A disease having the gross symptoms of purple top was found in a small planting on the Experimental Test Farm at Swannanoa. Most of the potatoes were nearing maturity and it was difficult to identify virus diseases positively in the certified seed plots. The plantings appeared to be relatively free of these diseases. Flea beetle injury was serious in some table stock plantings.

PEACH DISEASES. Luther Shaw.

Bacteriosis (Bacterium [Phytomonas] pruni) was of no economic importance in commercial peach orchards in North Carolina in 1941. Active infections were not found in many orchards where the disease was prominent in 1940. This was surprising since a period of heavy and more or less continuous precipitation occurred in midsummer when primary and rapid secondary

infections might be expected. Failure of such infections to take place was evidently related to some condition or combination of conditions of natural origin that had obtained during the winter or spring and had resulted in either inactivation or eradication of the overwintered inoculum. It is suggested that the extremely low precipitation and high temperatures that prevailed in April and May could have been major contributing factors.

Brown rot (Sclerotinia [Monilinia] fructicola) was observed in a few orchards but did not develop in epidemic proportions. This again was evidently related to the spring and early summer drought which inhibited the development of apothecia on overwintered mummies and thereby prevented normal primary infections. The scattered infections observed in midsummer probably resulted from primary conidial inoculum emanating from twig cankers during the rainy period that occurred at that time.

Scab (Cladosporium carpophilum) was prominent in several unprotected orchards, but was of no consequence in orchards systematically sprayed.

Curl (Exoascus [Taphrina] deformans) was not observed in a commercial orchard.

Root knot (Heterodera marioni) was unusually active, at least in its effects, during 1941. It is probable that the nematode itself was no more active than normal; however, affected trees were less able to survive with depleted root systems under the prevailing drought conditions. In consequence, there was an unusually heavy death of trees as a result of this disease during the 1941 season.

PEANUT DISEASES. Luther Shaw and T. T. Hebert.

Cercospora leafspots (Cercospora spp.) were generally prevalent but were not so severe as in previous years. A period of high rainfall in July favored primary and some secondary infections, but the period of drought in August and September materially retarded subsequent secondary infections. In consequence the effects of leafspot on shedding of foliage and reducing yields was somewhat overshadowed by the more pronounced effects of drought. Experimental dusts and sprays gave significant control of leafspots in the 1941 experiments, but did not result in increased yields of peanuts and hay of the magnitude obtained in previous years, which was evidently related to the drought conditions mentioned above.

Root rots were in general less severe than during years of normal precipitation, with the exception of rots caused by Rhizoctonia. Results of survey isolations indicated that this parasite was as prevalent as usual.

SMALL GRAINS. H. R. Garriss.

Considering the State as a whole, diseases of small grains were not so prevalent in 1941 as in some previous years. Three factors are regarded as instrumental in reducing these losses: (1) adoption of seed treatments by an increased percentage of growers, (2) larger acreages planted to recently developed disease-resistant varieties, and (3) prevailing dry weather during the growing season.

Wheat

Stinking smut (Bunt) (Tilletia tritici) was of rare occurrence in most cultivated fields. This is attributed mainly to the more or less general practice of planting seed treated with ethyl mercury phosphate dust.

Severe damage from the disease occurred in some fields planted with untreated seed. One field in Halifax County showed 25% bunt infection.

Loose smut (Ustilago tritici) was not generally destructive, although traces were observed in many fields of Redheart. Leaps 157 seemed to be practically free of the disease. Some county agents called attention to a tendency of some Redheart strains to have a large percentage of plants with Blue Stem characteristics. Observations in the field showed that by far the greater percentage of loose smut was occurring on plants showing these characteristics.

Rust (Puccinia rubigo-vera tritici) was observed in some varieties in demonstration plots. Damage in the State as a whole was slight. Very little black stem rust (Puccinia graminis) was observed.

Mildew (Erysiphe graminis) was rather common on some varieties. Heavy infections were observed on the leaves late in the season after the heads were mature and, therefore, little damage resulted.

Nematode (Tylenchus [Anguina] tritici) caused serious damage in some fields in the Piedmont. One field in Cleveland County showed a 25% loss due to heavy infestation with the nematode. Losses from the disease were more or less localized and, generally, no serious losses occurred.

## Oats

Loose smut (Ustilago avenae) was less severe than in the two preceding years, although several fields had infections too heavy for the fields to be certified (over 1%). The disease was most common on the Lee variety and was strikingly absent on Stanton, Victorgrain, Fullgrain 41, and Letoria. Covered smut (Ustilago levis [U. kolleri]) caused slight damage.

## Barley

Black loose smut (Ustilago nigra) was observed in most fields planted to common varieties; however, losses from the disease did not exceed 2% in these fields. Heavy infections were observed in fields of Sunrise, a Japanese variety recently introduced into the State. Losses in these fields ranged from 15 to 25% of the crop. Mere traces of black loose smut were observed in some fields planted to Iredell and Bearded 15, two recently developed resistant varieties.

Brown loose smut (Ustilago nuda) was not generally destructive although some fields suffered severe infection. One field in Union County (Piedmont) showed 20% or more damage from the disease. The seed planted in this field was treated with ethyl mercury phosphate, but not by the hot water treatment. This seed came from a field planted in 1940 with hot-water-treated seed, in which no smut was observed. Evidently floral infection in the 1940 field was brought about by spores blown in from other fields in the community.

Stripe (Helminthosporium gramineum) occurred in many fields but in a mild form.

SOYBEANS. S. G. Lehman.

Bacterial pustule (Bacterium [Phytomonas] phaseoli sojense) was present to a greater or less extent in every field examined. In some of the fields marked defoliation of lower and middle portions of the plants occurred. An accurate estimate of the relative proportions of this defoliation due to bacterial pustule and to shading is quite impossible. However, the yellowing of leaves and necrosis of large areas in others well up on the plants and apparently receiving adequate light exposure indicates that a considerable part of the defoliation was due directly or indirectly to the disease.

Frog-eye (Cercospora daizu) was found in but few fields and only in small amounts in these. The varieties commonly grown are not highly susceptible to infection by C. daizu.

Downy mildew (Peronospora sojae). Traces were present in nearly all fields examined. As a rule infections were few in number in commercial fields. Certain varieties in variety test plots were heavily infected, the spots being so numerous as to give a yellowish color to leaves.

DISEASES OF FLUE-CURED TOBACCO. K. J. Shaw and T. E. Smith.

Black root rot (Thielavia [Thielaviopsis]basicola). Loss was very slight. The weather was unusually warm during late spring and early summer. This condition was not favorable for development of the disease. Consequently, damage was less severe than in recent years.

Black shank (Phytophthora [parasitica var.] nicotianae) is estimated to have destroyed 1000 acres of tobacco or about one-quarter of 1% of the State acreage. In Forsyth, Guilford, and Rockingham Counties about 5% loss occurred. This disease is also present in Person, Caswell, Yadkin, and Pitt Counties. It was more severe in 1941 than during any previous year and appeared to be spreading rapidly.

Blue mold [downy mildew] (Peronospora tabacina)caused no actual plant damage in 1941, but growers prepared approximately twice the required seedbed area in anticipation of a severe attack. It is estimated that over 23 million square yards of seedbed were sown that were not actually needed. This inefficient use of plant bed space could have been avoided if growers had planned to use recommended control measures.

Fusarium wilt (Fusarium sp.) was estimated to have destroyed 500 acres of tobacco or a trace for the State as a whole. Serious losses occurred only in Columbus County where there is evidence of considerable spread in recent years.

Granville wilt (Phytomonas solanacearum) is estimated to have destroyed a total of 10,000 acres of tobacco or 2% of the State acreage. Heaviest losses occurred in Granville, Wake, and Durham Counties, but infested fields occurred in nearly all counties growing flue-cured tobacco.

Leaf spot diseases. During the early part of the season there was very little rainfall. Consequently, damage due to leaf parasites was unusually light in 1941, only a trace resulting to the crop as a whole.

Mosaic (Virus) was probably the most destructive of all tobacco diseases in 1941. It was generally present, causing an estimated loss of 5% for the State as a whole. Damage from mosaic is difficult to estimate because it lowers the yield and quality of the crop rather than killing the plant.

Root knot (Heterodera marioni) was more severe in 1941 than during recent years. Unfavorably dry weather early in the season retarded growth resulting in heavy infestation before the crop matured. A loss of 3% was estimated to be caused by this disease which was most severe in the Coastal Plain area.

Sclerotium rolfsii and Rhizoctonia solani. Damage to the crop as a whole was only a trace. However, in isolated fields, losses as high as 50% were observed.

DISEASES OF VEGETABLE CROPS. D. E. Ellis and Sidney Cox.

## Crucifers

Downy mildew (Peronospora parasitica) was unusually severe and caused extensive damage to cabbage and cauliflower seedlings in several localities in the coastal plains area in December 1941 and January 1942. The disease was particularly destructive in one locality in Beaufort County where losses in plant beds of 50 to 100% were observed. In another locality in Scotland County, an 8-acre drilled field-planting of cauliflower and cabbage seedlings was visited that showed uniform infection resulting in a loss of more than 50%.

## Cucurbits

Leaf blight (Macrosporium cucumerinum) [Alternaria cucumerina] was widespread on cantaloupe and caused substantial losses in the commercial melon growing areas in Scotland and Warren Counties. Excessive rainfall immediately preceding and during the picking season heightened the severity of the disease.

Downy mildew (Pseudoperonospora cubensis) occurred on cucumbers and cantaloupes but appeared too late in the season to cause extensive damage. It was first observed in the State on cucumbers at Willard, in Pender County, on July 9 and later occurred on cantaloupes in Scotland County.

An unusual fruit rot of cantaloupe in the field was observed in Warren County in July. Approximately 25% of the fruit in a 10-acre field was affected with a soft rot that caused a rapid and complete breakdown of affected tissues. A sterile phycomycetous fungus and the bacterial rot organism Erwinia melonis were consistently associated with the disease. Entrance appeared to take place through the uninjured rind in contact with the soil. The disease was not confined to the mature cantaloupe but affected fruit at all stages of development.

Anthracnose (Colletotrichum lagenarium) was widespread on cantaloupes, cucumbers and watermelons. Watermelon wilt (Fusarium bulbigenum var. niveum) was observed in both commercial and home garden plantings in several southeastern counties. Erwinia carotovora was found consistently associated with a stem rot of squash in New Hanover and Wake Counties. Powdery mildew (Erysiphe cichoracearum) was observed in numerous field plantings of cantaloupe in June and July but was of minor importance.

## Lettuce

Damping-off was widespread and severe in the commercial head lettuce areas of Pender and New Hanover Counties in January and February. Plant bed losses ranging from 25 to 90% were common throughout the area. Rhizoctonia solani was the most common organism found associated with the disease.

## Pepper

Bacterial spot (Phytomonas vesicatoria) was observed in field plantings in Sampson and Duplin Counties in June and July. The disease caused substantial reduction in yields in a few fields but it was not widespread in the pepper producing area as a whole. Other pepper diseases of minor importance encountered in the same localities included southern root rot (Sclerotium rolfsii) and anthracnose (Gloeosporium piperatum).

## Sweet Potato

Field and storage diseases of sweet potatoes caused severe losses in 1941. Diseases most frequently encountered included scurf (Monilochaetes infuscans), stem rot or wilt (Fusarium bulbigenum var. batatatis), black rot (Ceratostomella fimbriata), surface rot (Fusarium oxysporum), and internal breakdown (physiological).

## Miscellaneous

The root knot nematode (Heterodera marioni) was widespread on a number of vegetable crops throughout the coastal plains area. The disease was particularly severe on such crops as tomato, okra, cantaloupe, bean, soybean, and field pea.

Other diseases, most of which were of minor importance, observed during the year included anthracnose (Colletotrichum lindemuthianum), blight (Phytomonas phaseoli) and mosaic of bean; leaf spot (Phoma betae) of beet; early blight (Alternaria solani) and Granville wilt (Phytomonas solanacearum) of tomato; and blight (Phomopsis vexans) of eggplant.

(NORTH CARCLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING)

# FRUIT DISEASES IN THE OZARK SECTION OF ARKANSAS IN 1941

John C. Dunegan

This report, continuing the yearly summaries from Arkansas which have been published in the Plant Disease Survey Reporter since 1935, deals largely with the fruit-disease situation in the northwestern portion of the State. However, as in previous reports, the discussion is not confined entirely to this area.

The main problem confronting the growers in northwest Arkansas at the start of the 1941 season was the extent of the damage caused by the

very abrupt drop in temperature on November 11, 1940. Apple trees throughout the district apparently escaped serious injury but many peach trees showed very definite crotch and trunk injury. Some growers thought the trees were badly damaged and proceeded to remove them. The majority, however, were inclined to be more conservative and instead of initiating drastic measures decided to wait and see how the trees behaved during the spring. As the season progressed it became evident that in most peach orchards the injury was confined to the death of individual limbs and shoots rather than entire trees. In this respect the northwest Arkansas section was much more fortunate than fruit districts further north where large numbers of both peach and apple trees were killed by the November 11 freeze.

The start of the 1941 growing season was not marred by a sudden drop in temperature as the fruit trees came into bloom, such as occurred at the start of the 1939 and 1940 seasons. Warm clear weather prevailed during the blooming period and an excellent crop of peaches and plums set. A week of rainy weather when the apples were in bloom resulted in a light set in many orchards.

Rainfall was fairly adequate during the season, although there were periods of dry weather early in April, during the last half of May, and in August. The apple crop was seriously impaired by a late summer outbreak of the codling moth.

## Apple Diseases

Apple scab (Venturia inaequalis). Routine examination of overwintered scab lesions on apple leaves showed that ascus formation had started in a few perithecia as early as January 25 but mature asci with colored spores were not collected until March 27. Although mature ascospores were found in the orchards 15 days earlier in 1941 than in 1940, the absence of rainfall during the first 12 days of April retarded the development of primary infections and it was not until the week of April 13-19 that environmental conditions were favorable for the discharge of ascospores. A few primary lesions were found on the leaves of non-sprayed trees on April 24 and conidial infections were fairly general on the same trees by May 8. Scab lesions on the fruit were first observed on May 15, the same date that they were found in 1940. The further development and spread of the fungus was retarded by a period of dry weather during the last 15 days of May and although there were frequent showers early in June, the fungus failed to achieve any widespread distribution and as in 1940 was of comparatively minor importance. Non-sprayed Ben Davis trees used as a check in the 1941 spray experiment had only 15.7% of the crop (drops and harvested fruit combined) infected as contrasted to 22.7% in 1940 and 79.7% in 1939.

The 1941 season is still another example of how closely the outbreaks of the apple scab fungus in northwest Arkansas are correlated with the environmental conditions. This relation was discussed in last year's report (PDR 25:63-71. Feb. 1,1941). It is evident that unless the fungus becomes well established early in April the chances are that it will not cause serious loss.

Apple blotch (Phyllosticta solitaria). Frequent periods of cool rainy weather during the months of June and July favored the development of

the apple blotch fungus in 1941 as in 1940. The first fruit infections were noted on June 18, one day later than in 1940, and the disease was prevalent on non-sprayed fruit by July 12. The non-sprayed trees in the 1941 spray experiment had 43% of the fruit infected as compared to 49.2% in 1940.

The disease caused no appreciable loss in properly sprayed commercial orchards.

Bitter rot (Glomerella cingulata). Environmental conditions were favorable to the development of this disease and scattered infections were reported from the same commercial orchard that reported its presence in 1940. At the present time bitter rot has practically disappeared from the orchards of northwest Arkansas and has been of no commercial importance for a number of years.

Cedar rust (Gymnosporangium spp.) Pycnia of G. juniperi-virginianae were noted on apple leaves during the week ending May 10. Except for the extensive development of lesions on the fruit of the San Jacinto variety at the University Farm, only occasional specimens were noted during the season. The disease was of no commercial importance in 1941.

Black rot (Physalospora obtusa). Some frog-eye leaf spot developed on the foliage of the non-sprayed trees in the 1941 spray experiment but the disease was only of minor importance. The black rot fungus developed around the rust lesions on the San Jacinto variety and much of the fruit of this variety was destroyed by these secondary infections.

Phytophthora canker (Phytophthora cactorum). This organism was isolated from cankers near the soil line on the main stems of 1-year old Grimes trees submitted by a nurseryman. Similar specimens have been received from time to time during the past 10 years but this was the first time a definite organism was isolated from the obscure cankers. The pathogenicity of the isolate was proved by inoculation experiments.

## Peach Diseases

Winter injury. In northwest Arkansas the freeze of November 11, 1940, as already mentioned, caused considerable killing of individual branches on trees throughout the district. Typical trunk and crotch injury occurred in some orchards but there was no extensive killing of large blocks of peach trees. No reports of serious injury were received from the main peach producing areas south of the Ozark Mountains.

Brown rot (Sclerotinia [Monilinia] fructicola). Apothecia were found in the peach orchards around Fayetteville on March 31 and occasional specimens of blossom blight were noted in April. Early maturing varieties, such as Red Bird, only indifferently sprayed, suffered serious losses due to rotting of the fruit. The fungus was noted attacking the immature fruit of several nectarine trees in one orchard.

Typical blossom blight specimens were received from the Crowley's Ridge section in April and subsequent reports indicated that a number of orchards suffered serious loss from brown rot in 1941.

More complaints about inability to control this fungus were received in 1941 than for several previous years. It seems probable that there are many more "mummies" in the orchards and the fungus may cause serious damage if the right combination of environmental conditions prevail in the 1942 growing season.

Bacterial spot (Bacterium [Phytomonas] pruni), although present in most of the orchards of susceptible varieties in northwest Arkansas, was of relatively minor importance in 1941.

Rust (Tranzschelia pruni-spinosae discolor). Rust pustules were first noted on October 6 and by the end of the month were fairly prevalent in a number of peach orchards. No teliospores were found on the peach leaves in 1941. The typica variety occurring on wild cherry and plum also did not appear until late in the season but the fungus produced both urediospores and teliospores on these hosts.

Peach leaf curl (Taphrina deformans). A few specimens were collected on April 30 but the disease was of very minor importance in 1941. The warm dry weather prevailing early in April as the leaf buds unfolded presumably retarded the development of the fungus.

Peach rosette [virus]. An inspector of the Arkansas State Plant Board found several cases of peach rosette in a new locality near Rogers, Arkansas. The affected trees were destroyed. No additional cases were found on the farm where rosette was noted in 1939 and 1940.

### Plum and Cherry Diseases

Bacterial spot (Bacterium [Phytomonas] pruni). Although this disease was not particularly important on the peach in 1941, numerous specimens on cultivated plums were received from various parts of the State.

Cherry leaf spot (Coccomyces hiemalis) was present in a number of sour cherry plantings but caused little defoliation in 1941.
(COOPERATIVE INVESTIGATIONS BETWEEN THE DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES, BUREAU OF PLANT INDUSTRY, U.S.D.A., AND THE ARKANSAS AGRICULTURAL EXPERIMENT STATION).

## HEAT INJURY TO THE LEAVES OF CALIFORNIA BLACK OAK AND SOME OTHER BROADLEAVES

J. L. Mielke and J. W. Kimmey

A reddish-brown discoloration of the leaves of California black oak (Quercus kelloggii Newb.) became evident over extensive portions of this tree's range in the northern part of California early in July 1941. On July 13, when the writers first observed affected trees in the upper Sacramento River Canyon the injury was so pronounced that it imparted a reddish-brown cast to entire mountainsides. On the affected leaves, except

for a relatively small percentage that turned entirely brown, the browning was confined mainly to a broad, irregularly shaped band around the margins. A high percentage of the most severely injured leaves dropped shortly after the injury occurred, but the majority of the leaves remained on the trees for the greater part of the summer. A few trees lost almost all their leaves in July, and most of these produced a small crop of new leaves that began to appear in late July and early August, accompanied by new woody growth.

No evidence of injury to the buds or twigs was found. Although no examinations were made of roots, it seems improbable that they were injured materially, considering the situation at Happy Camp, which is described below. Injury by smoke or fumes from manufacturing plants was unlikely since no such plants of consequence occur in that part of the State.

The browning of the leaves occurred quite generally on the slopes of the Sacramento River drainage up to an elevation of around 4,000 feet, and also in the Klamath River drainage in the vicinity of Happy Camp. The injury was noted as most severe in the vicinity of Delta, situated in the Sacramento Canyon about 25 miles north of Redding. A striking characteristic of the injury was its uniformity regardless of site conditions, i.e., degree of slope, aspect, or soil moisture conditions. Trees growing along the banks of streams were as severely affected as those on steep and well drained slopes.

An examination of numerous affected trees revealed no evidence of insect or fungus attack. Instead, the injury seemed plainly attributable to abnormal weather conditions. In the northern part of California precipitation and temperature during the winter of 1940-41 was considerably above normal. This was followed by a late spring with temperatures below and rainfall above normal at most stations. As a result of the cool, moist spring weather, together with an abundance of soil moisture from the heavy winter precipitation that occurred mainly in the form of rain, there was a luxuriant development of most plants. This was particularly the case with California black oak, which produced a good crop of large and succulent leaves that by early July had not yet attained a degree of maturity normal for that period.

There were a few hot days in the latter part of May and again the first part of June, but high temperatures for a continuous period did not occur until early in July. During the period July 5 to 12, inclusive, maximum temperatures at Redding ranged between 100° and 105°F. These are not excessively high early-July temperatures at this station. Pertinent weather records for Redding (elev. 718 ft.), the closest station to Delta (elev. 1,322 ft.) for which complete records are available, are presented in table 1 and figure 1. Since there is a difference of only about 600 feet in elevation between the two places, maximum temperatures at both should be fairly similar. A check of incomplete records at Delta indicate this to be the case.

During the cool period from June 22 to 26, inclusive (figure 1) a total of 0.90 inch of rain fell at Redding. Following this short rainy period the maximum daily temperatures continued to rise almost without interruption until a peak of 105°F. was reached on July 5. Residents of Delta stated that the browned appearance of the oaks became evident a few

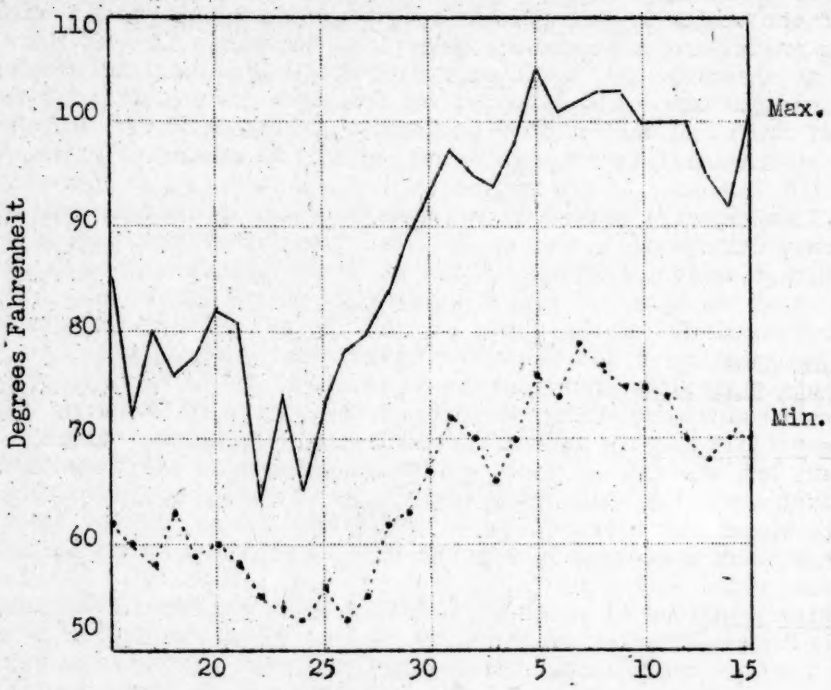


Figure 1.--Minimum and maximum temperatures at Redding, California, for the period June 15 to July 15, 1941.

Table 1.--Departure from normal temperature and precipitation, mean monthly temperature, and total monthly precipitation at Redding, California.[a/]

| Month (1941) | Temperature (degrees F.) | | Precipitation (inches) | |
|---|---|---|---|---|
| | Mean [b/] | Departure | Total for Month | Departure |
| January | 48.5 | + 3.2 | 16.12 | + 9.26 |
| February | 51.2 | + 1.5 | 11.71 | + 5.10 |
| March | 57.0 | + 3.0 | 5.32 | + 0.63 |
| April | 57.4 | - 2.4 | 6.78 | + 4.16 |
| May | 65.1 | - 1.3 | 4.38 | + 2.85 |
| June | 71.4 | - 3.7 | 1.26 | + 0.45 |
| July | 83.5 | + 1.7 | Trace | - 0.09 |

a/ U.S. Weather Bureau records.
b/ For 66-year period.

days later. All evidence indicated the injury to be attributable to heat injury of the tender leaves induced by the sudden change to the high temperatures prevailing between July 5 and 12. There was an abundance of soil moisture at the time, no strong or drying winds occurred, and the relative humidity was not abnormally low for this section of the State. On the grounds of the U. S. Forest Service Ranger Station at Happy Camp it was of interest to note that California black oak was as severely browned as the trees of this species in the immediately adjacent forest, despite the fact that the lawn on which the station trees were growing was watered almost continuously during the hot spell by an efficient sprinkling system. This indicates that the injury could not be attributable to a lack of soil moisture.

The principal tree associates of the injured oak are ponderosa pine (Pinus ponderosa Laws.), digger pine (P. sabiniana Dougl.), Douglas-fir (Pseudotsuga taxifolia (Poir.) Britton), bigleaf maple (Acer macrophyllum Pursh), white alder (Alnus rhombifolia Nutt.), and California buckeye (Aesculus californica (Spach) Nutt.). The conifers showed no evidence of heat injury and the broadleaves only occasional traces of it even though in many instances they were growing intermingled with severely affected California black oak trees.

From Redding southward about 30 miles to Red Bluff the main tree species are canyon live oak (Quercus chrysolepis Liebm.)and interior live oak (Q. wislizenii A. DC.). In general the leaves of these two oaks were moderately injured as compared with California black oak in the vicinity of Delta, although a small percentage of the trees of both species were quite badly injured. At the time the injury occurred the maximum temperatures at Red Bluff ranged from 1 to 3 degrees higher than at Redding.
(DIVISION OF FOREST PATHOLOGY, BUREAU OF PLANT INDUSTRY, COOPERATING WITH U. S. FOREST SERVICE, SAN FRANCISCO, CALIFORNIA).

## OVERWINTERING OF CROWN RUST OF OATS IN ARKANSAS IN 1941-42

H. R. Rosen

On March 3, 1942, crown rust [Puccinia coronata] was found on oats, variety Lee, at the University farm, Fayetteville. A few more pustules were found on March 13. Since a severe epidemic of crown rust appeared in the fall of 1941 in the same field, there was excellent opportunity to trace the rust through the winter and early spring.

As reported previously (PDR 25: 480-481, 1941), a scattering of crown rust was first noted in this field on October 3, 1941. With a mild fall and ample rain, this rust became so common that by the second week of November many of the plants of the variety Lee showed approximately 50% of the leaf area infected. It continued to spread throughout the whole month of December, the rate of spread being considerably reduced toward the end of the month.

The first week in January brought a sharp drop in temperature and a snowfall of about 3.5 inches. While this snow was on the ground, the temperature reached a low of -11°F. The temperature remained below

freezing up to January 11. This freeze killed all the oat foliage above the snow level. But on January 13, when the snow was gone, the lowermost leaves, which had been covered with snow, remained green and showed numerous pustules of crown rust. The pustules appeared to be considerably reduced in size and during the month of February they suffered considerable reduction in number when many of the older leaves started waning and gradually dying.

By the first week in March, much of the rust had disappeared and many plants had to be examined before any pustules could be found. Most of the infected leaves that remained alive showed straw-colored, dead areas where the rust had been, indicating the death of the rust. Nevertheless, a few tiny pustules were located, and by March 13 some of these were found shedding urediospores.

There can be little doubt that crown rust overwintered in the uredial stage in this field, although the amount of overwintering represented a minute fraction of the initial number of infections. It is not known whether the overwintering was accomplished by means of mycelium or as uredial primordia. There is a suggestion that only the latter were involved since many leaves examined showed flecks suggestive of early stages of crown-rust infections but without indication that the fungus is capable of producing uredia. This suggestion requires verification.

Unlike the early spring of 1941, which showed no crown rust on winter oats, despite the severe fall epidemic of 1940 (the November 1940 freeze having killed apparently all of the rust), the stage in March 1942 is set for an epidemic of crown rust on winter oats in Arkansas, given favorable temperature and rainfall.
(ARKANSAS AGRICULTURAL EXPERIMENT STATION).

## CURRENT REPORTS ON PLANT DISEASES

APPLE SCAB DEVELOPMENT IN ILLINOIS: Examination of about 50 perithecia of Venturia inaequalis from leaves collected on February 5 showed one perithecium with three asci containing mature (brown) ascospores. This is the earliest date recorded for the State of Illinois. The previous record was February 22. Most of the asci from other perithecia were just forming but in a few they were at least half the normal length and on one leaf several asci were found in which the outline of the spores could be seen.

Leaves examined at intervals between February 5 and March 2 show little additional advance. A few mature ascospores were found on two dates since February 5 and some increase in the number of asci having outlined spores was noticed.

The early development of ascospores this year may be due to the unusual December and January weather conditions. In December at Urbana there were 18 days with maximum temperatures above 40° and 13 above 50°; in January there were 18 days with maximums above 40° and 10 days above 45°. While there was a very severe cold period from January 3-10 (-10° on January 10), the latter part of the month and the first few days of February

were uniformly warm. The lack of development after February 5 was due, no doubt, to a cold period with temperatures below freezing most of the time. (H. W. Anderson, University of Illinois, March 5).

TOBACCO PLANT BED DISEASES IN GEORGIA: Drowning and damping-off have taken a very heavy toll in many beds. In Tift and adjoining counties I estimate at least a 30% loss of the small plants. There is, as yet, very little blue mold [Peronospora tabacina] in this section because the plants are still quite small. (John G. Gaines, Assistant Pathologist, Division of Tobacco Investigations, Tifton, Georgia).

## FEBRUARY WEATHER AND THE WINTER OF 1941-42

(U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for weeks ending March 3 and March 10, 1942.)

FEBRUARY WEATHER: The first decade of February 1942 was decidedly warm for the season throughout the country, except in the more eastern States where temperatures were slightly below normal. Following this mildness, there was a reaction to abnormally cold weather west of the Rocky Mountains during the week ending the 17th, and thereafter, and subnormal temperatures prevailed in nearly all States, especially during the week ending February 24. Thus, in general, the first half of the month was mild for the season to abnormally warm and the last half decidedly cold.

Figure 1 shows that the temperature for February, as a whole, averaged considerably below normal from the Ohio Valley southward, eastward, and northeastward, with the monthly deficiences mostly from 3° to 6°. The Pacific coast had about-normal warmth, but the Great Basin and the Rocky Mountain States were decidedly cold. On the other hand, the temperature averaged above normal from the Lake region westward to the Great Plains.

For February precipitation see below and figure 2.

THE WINTER OF 1941-42: The outstanding feature of the weather during the 1941-42 winter season (December-February) was the persistence of prevailing temperatures rather than the usual frequent alternations between relatively warm and cold successive short periods. The first decade of December was abnormally warm throughout the country, followed by a cold week in Eastern States, but a continuation of warmth in the West. The last half of December was abnormally warm, except for extremely cold weather during the last week in the more western States. The western low temperatures drifted slowly eastward and the first half of January had severe wintry conditions quite generally, followed, however, by abnormal warmth during the last half of the month. Again, the first half of February was mostly warm and the last half decidedly cold. Thus there was a general tendency during the winter for a given condition, relatively cold or warm, to persist in sequences of 2 weeks or more in duration.

Figure 3 shows the average departure from normal temperature for the 3 winter months (December-February) combined. For the country as a whole, the season was warmer than normal, although in most of the South, locally in the Northeast and in much of the Rocky Mountain and Great Basin

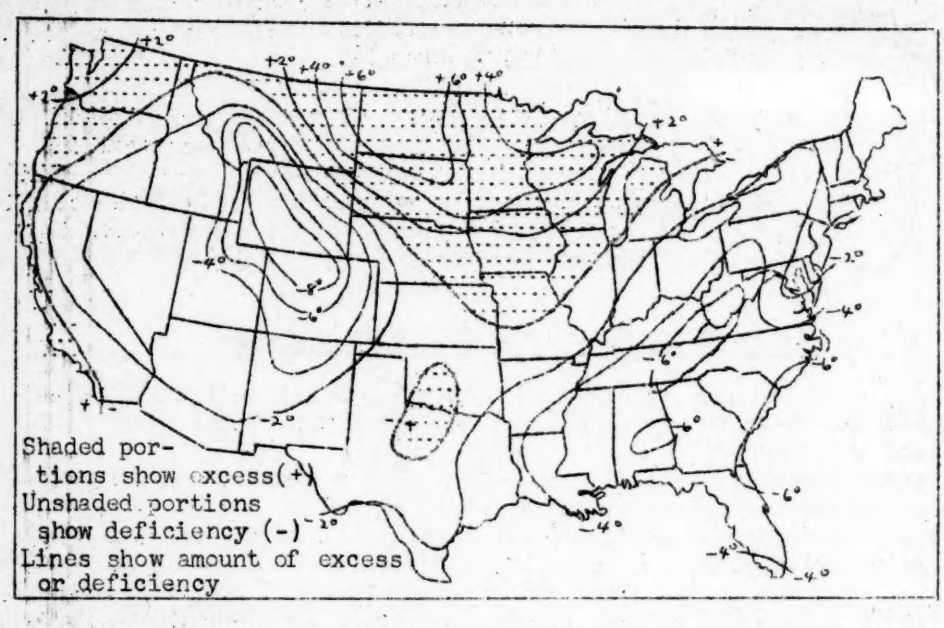


Figure 1--Departure of Mean Temperature from the Normal for February 1942.

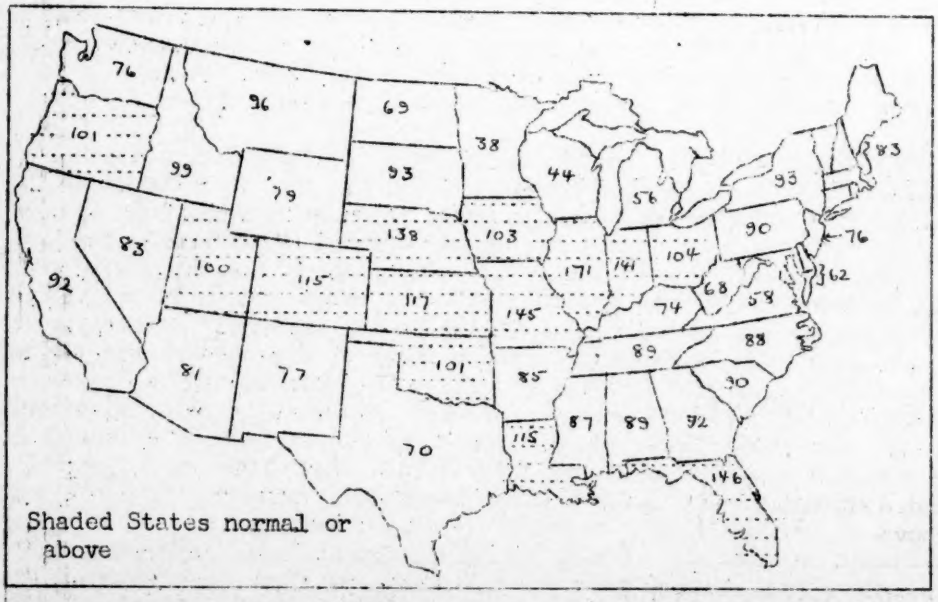


Figure 2--Percentage of Normal Precipitation by States, February 1942.

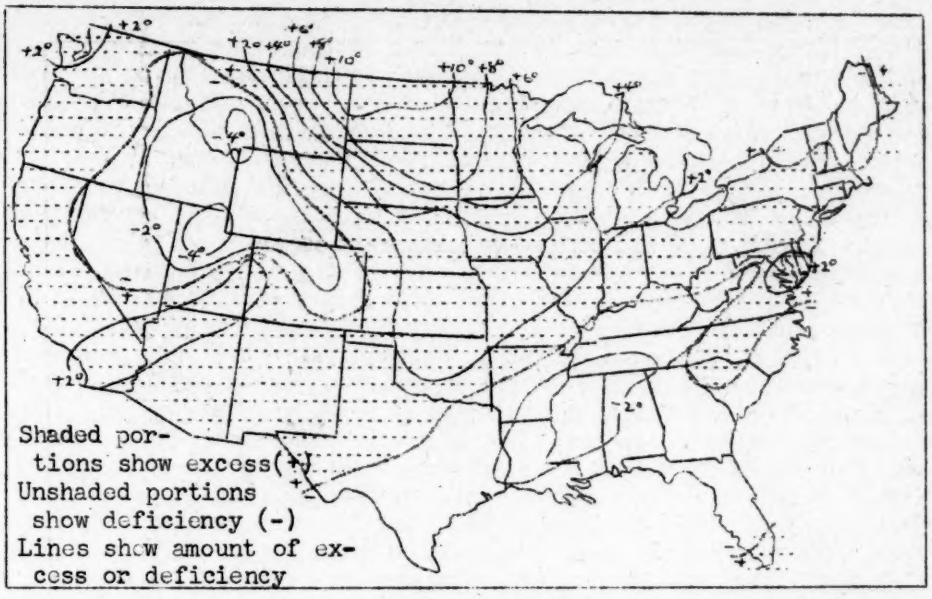


Figure 3--Departure of Mean Temperature from the Normal for the Winter (December-February) 1941-42.

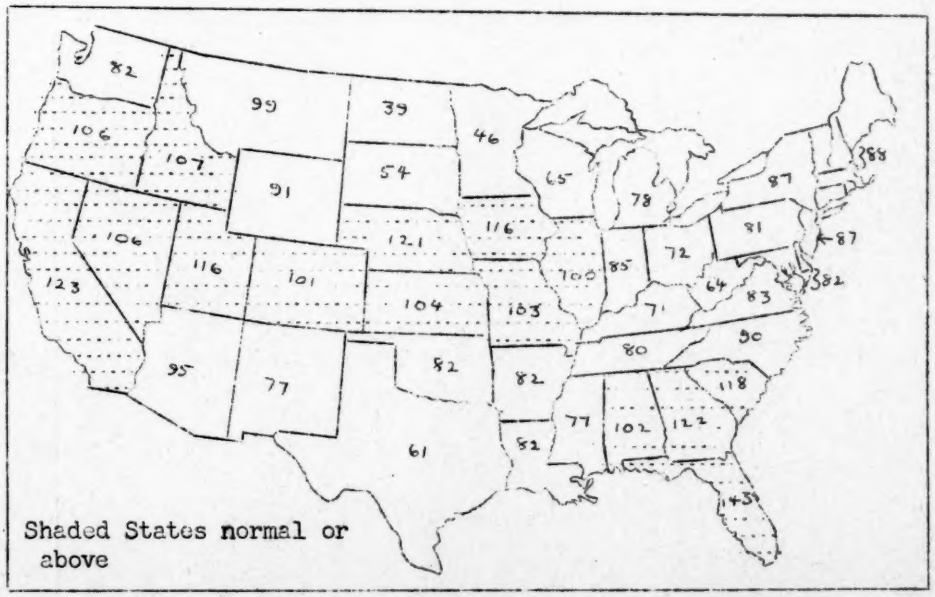


Figure 4--Percentage of Normal Precipitation by States, Winter, December 1941-February 1942.

areas the temperature averaged below normal. From the Lake region westward to the Rocky Mountains and in the lower Missouri and middle Mississippi Valleys the winter as a whole was decidedly warm, especially in the northern Great Plains where some stations reported average temperatures for the season up to 10° or more above normal. The Pacific and middle Atlantic areas had moderately above normal temperatures for the period.

January, with only 67 percent of normal for the country as a whole, and Florida alone having as much as normal rainfall, was by far the driest month of the winter. December was unusually wet in the Southeast, some central midwestern areas, and generally west of the Rocky Mountains. The average for the entire United States for this month was 2.67 inches, or 16 percent above normal. February was relatively dry from the Ohio River southward, eastward, and northeastward, except that heavy rain occurred in Florida (Figure 2). The middle Atlantic area was relatively the driest section of the country; Virginia had only 58 percent of normal and Maryland and Delaware 62 percent. The northern Ohio and central Mississippi Valleys and central Great Plains had more-than-normal precipitation in February, but the States from the Lake region westward had deficiencies. West of the Rocky Mountains only Utah and Oregon had as much as normal. For the country, as a whole, the February average was 1.98 inches, or 92 percent of normal.

Figure 4 shows the percentage of normal for the 3 winter months combined. The Southeast, led by Florida, had above-normal rainfall for the season; also, a few central Midwest States and most of those west of the Rocky Mountains, led by California with 123 percent. On the other hand, the winter had less-than-normal precipitation from the Lake region westward to the Rocky Mountains, as well as in the middle Atlantic area and the States from Arkansas and Louisiana westward to Arizona. For the country, as a whole, the winter average was 6.30 inches, being slightly more than 90 percent of normal.